

REMARKS

Applicants hereby respond to the outstanding rejections. Applicants request further examination, and reconsideration and withdrawal of the outstanding rejections for at least the reasons that follow.

Claim 1 has been amended to point out that the spherical nodule forming the second part of the dissymmetric particle is coupled to the first part by means of a coupling agent, which is adsorbed or covalently grafted to the outer surface of said first part.

Claim 2 is cancelled.

Claim 4 is amended to be dependent on claim 1.

Withdrawn claims 15-38 have been amended to be in conformity with the pending claims, in the event of rejoinder, which is respectfully requested.

Claim 2 has been cancelled and claim 4 has been amended to reply to the Examiner's objections under 37 CFR 1.75(c) and rejections under 35 USC §112.

Claim 1 has been amended to state that the outer surface of the first part is modified by means of a coupling agent which is adsorbed or covalently grafted to the outer surface of the first part, and which is used for coupling said first part to the second part constituted by the nodule. This claim amendment is supported by the specification as filed (see at least page 4, line 13, page 7, lines 1445, 21, 25-26, from page 7 line 35 to page 8, line 5, page 8, lines 34- 35, and examples 1 to 3).

The claimed embodiments include a dissymmetric particle constituted by two parts, a first part made of an inorganic material and a second part made of a single organic nodule, said nodule being coupled to the first part via a coupling agent adsorbed or covalently grafted to the first part.

This subject of the pending claims is neither disclosed nor suggested by the prior art documents for at least the following reasons.

Xia et al. ("A self assembly approach to the formation of asymmetric dimers...") disclose asymmetric dimers constituted of a polystyrene bead and a silica ball, having sizes greater than $1\mu\text{m}$ (Fig. 2c).

The polystyrene bead and the silica ball are trapped in a cylindrical hole and come in physical contact because of attractive capillary forces between their surfaces. Once formed, the two particles could be permanently welded into a single piece by heating (see page 772, left column, first paragraph).

The claimed subject-matter differs from the disclosure of Xia in that the claimed dissymmetric particle has a size of at most $1\mu\text{m}$, and the two parts of the particle are coupled therebetween by means of a coupling agent, which is adsorbed or covalently grafted to the surface of the first part.

Reculusa et al. disclose raspberrylike silica/polystyrene materials, i.e., symmetric particles. As shown in Figure 4, the synthesis of this material involves the adsorption of macromonomer chains on the silica particle, each macromonomer chain being aimed to react with the monomer during the polymerization, so as to provide a silica particle carrying a plurality of polystyrene nodules.

In contrast, the particles of the instant claims are dissymmetric and comprise a single nodule of organic material, which is coupled to an inorganic part.

The claimed subject matter is not obvious over Xia et al. in view of Reculusa et al. for at least the following reasons.

The size of the particles produced by Xia et al. is different than, and in particular larger than, the size of the particles produced by Reculusa et al.

Moreover, the mode of production (solvent evaporation and heating) of the particles of Xia et al is different from the mode of production (emulsion polymerization) of Reculosa et al.

Even if Xia et al. were properly deemed to suggest a change in the size of the polymer beads, Xia et al. state that the only requirement in this respect would be the availability of trapping holes with smaller dimension (see page 772, right column, last paragraph).

Xia et al. do not suggest a change in the mode of production of the particles and, in particular, binding the polystyrene bead to the silica ball by means of a coupling agent. On the contrary, the polystyrene bead is coupled to the silica ball by direct binding or welding, which results from heating the sample.

It would not have been obvious for a skilled person to combine the teaching of Xia et al. with the teaching of Reculosa et al. The two methods concern different modes of production for particles having different shapes and different composition (with or without coupling agent).

Even if Reculosa et al. were properly deemed to suggest the use of coupling agents for coupling polystyrene nodules to a silica particle, Reculosa et al. do not disclose or suggest how to couple a single nodule of polystyrene to a silica particle to form a dissymmetric particle.

Indeed, Reculosa et al. is concerned exclusively with symmetric particles. Moreover, as taught by Reculosa et al., the surface of the silica particle should be saturated with the macromonomer chains so as to provide said particle with a plurality of polystyrene nodules.

Reculusa et al. thus fails to suggest how to produce a dissymmetric particle having a single polystyrene nodule coupled by a coupling agent to a silica particle.

In view of the teachings of Xia et al and of Reculusa et al., the skilled person would have been of the opinion that it would not have been possible to produce a dissymmetric particle with the mode of production disclosed by Reculusa et al., since Reculusa et al. disclose only symmetric particles.

Thus, it would not have been obvious for the skilled person to use a coupling agent as disclosed by Reculusa et al. to bind a single polystyrene bead to a silica particle as disclosed by Xia et al.

Since the two references taken together fail to provide any well reasoned basis or suggestion for producing a dissymmetric particle having a single nodule coupled via a coupling agent to a particle, it would not have been obvious for the skilled person to produce the claimed subject matter merely by reference to those prior art documents. The rejection thus fails to make a prima facie case of obviousness, and the rejection is properly withdrawn in favor of a Notice of Allowance.

Conclusion

For at least the reasons stated above, the Examiner is respectfully requested to reconsider and withdraw the outstanding rejections and objections, and to allow the present application.

In the event that there are any questions concerning this amendment, or the application in general, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution of the application may be expedited.

The Director is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.20(d) and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800.

Respectfully submitted,

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